REGIONAL WATER QUALITY AND WASTEWATER CONCERNS: TECHNOLOGY TRANSFER, ENVIRONMENTAL EDUCATION AND INFORMATION DISSEMINATION THAT WORKS

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Abstract. Water resource managers should be knowledgeable about recent research that identifies the major water quality problems affecting regional environmentally sound economic development. Besides indicating the major problem areas, the attitude, motivation and support of the citizenry relative to these water supply and disposal quality issues is discussed. Industrial plant operators will also find the research worthwhile.

INTRODUCTION

Current research in the southeastern United States (Kundell, 1996) indicates that over 50% of the public are very concerned about water pollution. Water resources management in Georgia need this information because it is pertinent to the concerns of contemporary citizens who will be significantly involved in any activity which will effect their economic well-being.

The paper's purpose is to direct managers responsible for a quality water supply and/or proper disposal of wastewater effluents (including industrial plant operators) to recent research which will be of value to them. The attitude and motivation of the community population to these water supply and disposal quality issues is important for environmentally sound economic development to be successful. Kundell (1996) indicates that this pollution is primarily due to: a) industrial and commercial wastewater discharges, b) agricultural, building and highway construction runoff and sewage plants, c) nonpoint source pollution, d) community apathy, environmental illiteracy, lack of information, and absence of public support and funding.

WATER QUALITY PROBLEMS AND SOME SOLUTIONS

The following are major water quality problems and some solutions that have worked in Georgia.

Industrial Wastewater Pollution

Water pollution from industrial waste problems are caused primarily by discharges from the operations of industrial plants and commercial enterprises.

Technology Transfer That Works

Biotechnology methods of industrial waste minimization and elimination funded by the Georgia Environmental Technology Consortium (GETC) of the Georgia Research Alliance (GRA) have assisted the pulp and paper industry in meeting wastewater regulations while decreasing processing costs.

A Pulp and Paper Success

Biotechnology research at The University of Georgia has demonstrated technology transfer activities which are successful support of the pulp and paper industry. (Eriksson, 1991). These biotechnology transfer accomplishments were used for the purification of conventional waste bleach waters from the bleaching process. The waste water minimization and elimination accomplishments were successful. The process was less expensive and more environmentally benign.

Identifying means to reduce costs of processing pulp which is environmentally safe is a major concern of the pulp and paper industry. Industry information is proprietary. But, even with the very high capital investment required to change from the chlorine bleaching process and it's high cost pre-discharge treatment, the new process, is still economically favorable. Pulp and paper mills are going on stream with this full scale commercial process in the spring of 1997 in North America, Europe, and Asia.

Another Pulp and Paper Success

The "Microbial Remediation of Pulp and Paper Effluents" project headed by M. Mitchell of Clark Atlanta University (CAU) is also funded by the GETC. Cost effective

Cost effective bioremediation technologies using microbial mats to reduce and cleanup effluents has a major payoff for not only pulp and paper, but for all Georgia industry.

Reduction of contaminated water will result in stronger economic development and major industry savings (Bender and Philips, 1993).

AND ANOTHER PULP AND PAPER SUCCESS

The "Non-Chlorine Bleaching of Kraft Pulp" where Principal Investigator, A. Baumstark of GSU has demonstrated the development of more efficient, non-chlorine ways of bleaching pulp was also funded by the GETC. Solving the chlorine problem in the bleaching process for kraft pulp will make a major contribution to economic development. Identifying means to reduce costs of processing pulp which is environmentally safe is a major issue with the pulp and paper industry. Helping Georgia's pulp and paper industry locate where water is not in abundance, will reduce costs to the consumer, and will improve the competitive edge of these Georgia industries (Baumstark, et al, 1994).

Agricultural Runoff and Sewage Plants

Runoff from agriculture, particularly crop and contained animal farming, are the principal causes of contamination of creeks and streams. Cropland erosion containing soil, crop nutrients, pesticides, and other organic matter is also a factor.

Agricultural Runoff

Agricultural runoff concerns are minimized through precision farming, and nonpoint sources of pollution (due to agricultural runoff) are monitored and reported by community volunteers. Precision farming techniques developed at the National Environmentally Sound Production Agricultural Laboratory (NESPAL) of the GETC have proven effective in controlling agricultural runoff. These methods reduce agrochemical driven nonpoint source pollution.

The Alcovy River Greenways Project involves the community in natural resource and environmental conservation including evaluation of agricultural runoff sources of nonpoint pollution.

Sewage Plants

Sewage plants subject to stormwater overflows bypassing the wastewater treatment process are also causes of contamination.

Informed Community Action

Faced with a federal mandate, to clean up a Combined Sewer Outfall problem, Columbus GA used a Special Local Option Sales Tax (SPLOST) to solve several community problems, and prepare themselves for future economic development opportunities.

The CSO was $65 million of the total $170 million funded plan. The referendum for this plan was passed by the citizens with over 65% being in favor of the plan.

Runoff from Building, Road and Highway Construction

Real estate economic development activities such as shopping malls, industrial and commercial construction, and transportation infrastructure also cause excessive runoff which contaminant water supply feeder streams. Excessive erosion and sedimentation also affect the biolological scheme of the water sources.

The Adopt-A-Stream Program

After heavy rains, Adopt-A-Stream volunteers discovered a muddy trickle that at one time was a healthy stream. The U.S. Army Corps of Engineers (ACOE) was alerted and issued a "cease and desist" order which required that the contractor comply with proper Best Management Practices, among other requirements (Hawks, 1995).

Regionally Important Resource Projects

The Pine Mountain Ridge Regionally Important Resources Project regional planning groups are monitoring local streams for nonpoint source pollution (Crow and Cowie, 1996).

Nonpoint Source Pollution

The most difficult to detect and control source of contamination of water sources is "nonpoint source pollution." Agricultural landscapes account for up to two-thirds of the nonpoint pollution sources identified. The contamination is due to crops, animals and integrated crops/animal systems. Runoff from building, road and highway construction is the other major contributor.

Community and Government Involvement

Agricultural and building, road and highway construction are the major causes of nonpoint sources of pollution. Some programs minimizing this contamination are:

1. The Chattahoochee River Headwaters Riparian Restoration and Education Project identifies and assesses the causes and locations of nonpoint source pollution in the headwaters of the Upper Chattahoochee watershed (Risse, 1995).
2. The City of Atlanta's Urban Watershed Initiative monitors water quality standards in streams, improves water quality and stream habitat, and increases citizen, government, and business awareness of watershed pollution in the South River and Chattahoochee watersheds.

Ignorance and Apathy

The ignorance and apathy, reported by Kundell, have been replaced in many communities with increase in environmental education effort followed by dynamic citizen participation and sometimes leadership in solving the community's problems.

Environmental Education

Organizations involved in environmental education. Government and public agencies: a) Georgia Water & Pollution Control Association, b) the U.S. and Georgia Environmental Protection agencies, c) Adopt-A-Stream (AAS), d) Georgia Water Pollution Control Federation, (e) state and county public utilities, (f) the University System of Georgia, and many others. Additionally, some nonprofits and community groups are: a) the Izaak Walton League, b) Save Our Streams, and c) Georgia Clean and Beautiful groups.

Examples of government and public agencies. The AAS provides environmental education at five Regional Training Centers (RTC) where volunteer groups are trained. The environmental education involves monitoring and control of water quality and stream health. The two most important outputs are: a) heightened public interest in prevention of nonpoint source pollution and b) increased public understanding of water pollution control and citizen volunteer monitoring.

The Environmental Protection Agency's Education Division has a new position, Nonpoint Source Education Coordinator. The coordinator will offer educational programs on nonpoint source pollution for teachers, students and community volunteer groups.

Nonprofits and community groups. The Pine Mountain Ridge Regionally Important Resources Project is an example of both a community and environmental education effort. Crow and Cowie (1996) reported that environmental education/information dissemination meetings improved the performance of regional planning groups. It was recognized that regional communication was a significant contribution and an essential element of Georgia's RIR program.

The Alcovy River Greenways Project is a joint community and university project. In this project, ICAD professionals held several environmental education/information dissemination meetings for community stakeholders. These included sessions on greenway topics, such as: a) transportation, b) recreation, c) environmental conservation, d) economic development, e) historic preservation, and f) public education. The multi-month effort included the development of a plan which identified opportunities to inform and involve local, state, and federal agencies, private organizations, landowners, and interested citizens.

Information dissemination. The first annual "Precision Agriculture '96: Southeast Trade Show & Forum" is a good example of specific environmental information dissemination. This combination trade show and information exchange forum featured the latest technologies with education and discussion sessions focusing on precision farming. The sessions focused on the human, hardware, and software needs of site specific agriculture. Some session titles were: Overview of Precision Farming, Getting Started: Technical Issues, Understanding GPS and GIS Systems, Yield Mapping, Remote Sensing, and Variable Rate Technologies.

It is difficult to separate environmental education and information dissemination. Some environmental education agencies are also involved in information dissemination. These are: a) the EPD Adopt-A-Stream Program, b) the Environmental Protection Agency's Education Division, c) the Izaak Walton League of America, d) the Pine Mountain Ridge Regionally Important Resources Project, and e) the Alcovy River Greenways Project.

CONCLUSION

The public is very concerned about water pollution (Kundell, 1996). Water resources management in Georgia are finding that contemporary citizens are becoming significantly involved in many activities relating to water supply and/or wastewater disposal which will effect economic development. Communities are becoming more involved with these water supply and disposal quality issues because they are important for environmentally sound economic development to be successful. The examples of successful problem solutions, shown here, are available to all, water resources management, industrial plant operators, and the myriad of agencies, organizations and community groups interested in environmentally sound economic development.

LITERATURE CITED

Baumstark, A., et al, "Bleaching kraft pulps with in situ-generated diozirones." *Institute of Paper Science and Technology, Technical Series* No. 153 (April, 1994).

Bender, J. and P. Phillips. "Implementation of microbial mats for bioremediation." In *Emerging Technology for Bioremediation of Metals*, edited by J.L. Means and R.E. Hinchee. Boca Raton: Lewis Publishers, 1993.

Crow, Susan R., Cowie, Gail M. *Journal of the National Association of Regional Councils* (Spring 1996).

Cummings, R. "Water resources management in Georgia: Lessons from experiences in the western states." *Journal of Agribusiness* 11, no. 2 (Fall 1993): 85-100.

Eriksson, K.-E. "Biotechnology: Three approaches to reduce environmental impact caused by the pulp and paper industry." *Science Progress* 75 (1991): 175-189.

Eriksson, K.-E. and R. Dinus. "Progress towards making trees easier to pulp and bleach." *Pulp Paper Magazine* 5/6 (1990): 40-44.

Eriksson, K.-E. "New development for purification of waste bleach waters." *Proc. Tappi Environmental Conference* 1 (1991): 427-431.

Hawks, Laurie J., 1995. Georgia's Adopt-A-Stream Program. In *Proceedings of the 1995 Georgia Water Resources Conference*, ed. K. J. Hatcher. Athens, Georgia: The University of Georgia, 1995.

Kundell, James E., March 1996. Environmental Trends: Implications for Small Communities in the South. Conference of Southern County Associations.

McGovern, James F., 1996. Environmental Education: Giving Eyes to the Citizenry So They See the Environmental Problems Facing Their Communities. In *Georgia Water & Pollution Control Association.* Columbus, Georgia.

Mitchell, Sarah V., 1995. Environmental Education Program Design for Student and Adult Audiences. In *Proceedings of the 1995 Georgia Water Resources Conference*, ed. K. J. Hatcher. Athens, Georgia: The University of Georgia.

Risse, Mark, 1995. Agricultural Pollution Prevention Efforts in Georgia. In *Proceedings of the 1995 Georgia Water Resources Conference*, ed. K. J. Hatcher. Athens, Georgia: The University of Georgia.